

SEQUENCE LISTING

<110> Goryshin, Igor Y
Naumann, Todd A
Reznikoff, William S

<120> DOUBLE TRANSPOSITION METHODS FOR MANIPULATING NUCLEIC
ACIDS

<130> 960296.97541

<140>

<141>

<150> 60/251482

<151> 2000-12-05

<160> 10

<170> PatentIn Ver. 2.1

<210> 1

<211> 38

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: LINKER A (FULL
LENGTH)

<400> 1

ctgtctcttg atcagatcta cttgtgtata agagtcag

38

<210> 2

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: LINKER A
(COMPRESSED)

<400> 2

ctgtctcttg atcagatgtg tataagagtc ag

32

<210> 3

<211> 38

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: LINKER B (FULL
LENGTH)

<400> 3

ctgtctcttg atcagatcta gatgtgtata agagacag

38

<210> 4
<211> 32
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: LINKER B
(COMPRESSED)

<400> 4
ctgtctcttg atcagatgtg tataagagac ag

32

<210> 5
<211> 24
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PRIMER FWD2

<400> 5
cagatctcat gcaagcttga gctc

24

<210> 6
<211> 25
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PRIMER

<400> 6
ggtctgcttt ctgacaaaact cgggc

25

<210> 7
<211> 25
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PRIMER

<400> 7
acgcgaaata cgggcagaca tggcc

25

<210> 8
<211> 3277
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Pgt4

<400> 8
gacagctgtc tcttgatcag atctcatgca agcttggctg cagggggggg gggaaagcca 60

cggttggtct	caaaatctct	gatgttacat	tgcacaagat	aaaaatatat	catcatgaac	120
aataaaactg	tctgcttaca	taaacagtaa	tacaaggggt	gttatgagcc	atattcaacg	180
ggaaacgtct	tgctcgaggc	cgcgattaaa	ttccaacatg	gatgctgatt	tatatgggta	240
taaatgggct	cgcgataatg	tcgggcaatc	aggtgcgaca	atctatcgat	tgtatgggaa	300
gcccgatgcg	ccagagttgt	ttctgaaaca	tggcaaaggt	agcgttgcca	atgatgttac	360
agatgagatg	gtcagactaa	actggctgac	ggaatttatg	cctcttccga	ccatcaagca	420
ttttatccgt	actcctgatg	atgcatgggt	actcaccact	gcgatccccg	ggaaaacagc	480
attgcaggta	ttagaagaat	atcctgattc	aggtgaaaat	attggtgatg	cgctggcagt	540
gttcctgcgc	cggttgcaat	cgattcctgt	ttgtaattgt	ccttttaaca	gcgatcgcgt	600
atctcgtctc	gctcaggcgc	aatcacgaat	gaataacggt	ttggttgatg	cgagtgattt	660
tgatgacgag	cgtaatggct	ggcctgttga	acaagtctgg	aaagaaatgc	ataagctttt	720
gccattctca	ccggattcag	tcgtcactca	tggtgatttc	tcacttgata	accttatttt	780
tgacgagggg	aaattaatag	gttgatttga	tgttgacga	gtcggaaatcg	cagaccgata	840
ccaggatcct	gccatcctat	ggaactgcct	cggtgagttt	tctccttcat	tacagaaacg	900
gctttttcaa	aaatatggta	ttgataatcc	tgaatatgaat	aaattgcagt	ttcattttgat	960
gctcgatgag	tttttctaag	cagaattggt	taattggttg	taacactggc	agagcattac	1020
gctgacttga	cgggacggcg	gctttgttga	ataaatcgaa	cttttgctga	gttgaaggat	1080
cagatcacgc	atcttcccga	caacgcagac	cgttccgtgg	caaagcaaaa	gttcaaaatc	1140
accaactggt	ccacctacaa	caaagctctc	atcaaccgtg	gctccctcac	tttctggctg	1200
gatgatgggg	cgattcaggc	ctggtatgag	tcagcaacac	cttcttcacg	aggcagacct	1260
cagcgccccc	ccccccctgc	aggtcgactc	tagaggatcc	ccgggtaccg	agctcgaatt	1320
cagatctgat	caagagacag	ctgtcgacgt	caggtggcac	ttttcgggga	aatgtgcgcg	1380
gaacccttat	ttgtttattt	ttctaaatac	attcaaatat	gtatccgctc	atgagacaat	1440
aaccctgata	aatgcttcaa	taatattgaa	aaaggaagag	tatgagtatt	caacattttc	1500
gtgtcgccct	tattcccttt	tttgccgcat	tttgcttcc	tgtttttgct	caccagaaa	1560
cgctggtgaa	agtaaaagat	gctgaagatc	agttgggtgc	acgagtgggt	tacatcgaaac	1620
tggatctcaa	cagcggtgaag	atccttgaga	gttttcgccc	cgaagaacgt	tttccaatga	1680
tgagcacttt	taaagttctg	ctatgtggcg	cggtattatc	ccgtattgac	gccgggcaag	1740
agcaactcgg	tcgccgcata	cactattctc	agaatgactt	ggttgagtac	tcaccagtca	1800
cagaaaagca	tcttacggat	ggcatgacag	taagagaatt	atgcagtgct	gccataacca	1860
tgagtataaa	cactgcggcc	aacttacttc	tgacaacgat	cggaggaccg	aaggagctaa	1920
ccgctttttt	gcacaacatg	ggggatcatg	taactcgcct	tgatcgttgg	gaaccggagc	1980
tgaatgaagc	cataccaaac	gacgagcgtg	acaccacgat	gcctgtagca	atggcaacaa	2040
cgttgcgcaa	actattaact	ggcgaactac	ttactctagc	ttcccggcaa	caattaatat	2100
actggtatga	ggcgataaaa	gttgacggac	cacttctgcg	ctcgccctt	ccggctggct	2160
ggtttattgc	tgataaatct	ggagccgggtg	agcgtgggtc	tcgcggtatc	attgcagcac	2220
tggggccaga	tggtaaagccc	tcccgatatcg	tagttatcta	cacgacgggg	agtcaggcaa	2280
ctatggatga	acgaaataga	cagatcgctg	agataggtgc	ctcactgatt	aagcattggg	2340
aactgtcaga	ccaagtttac	tcatatatac	tttagattga	tttaaaactt	catttttaat	2400
ttaaaaggat	ctaggtgaag	atcctttttg	ataatctcat	gacccaaaatc	ccttaacgtg	2460
agttttcgtt	ccactgagcg	tcagacccccg	tagaaaagat	caaaggatct	tcttgagatc	2520
ctttttttct	gcgcgtaatc	tgtgcttgct	aaacaaaaaa	accaccgcta	ccagcgggtg	2580
tttggttgcc	ggatcaagag	ctaccaactc	tttttccgaa	ggttaactggc	ttcagcagag	2640
cgcagatacc	aaataactgtc	cttctagtgt	agccgtagtt	aggccaccac	ttcaagaact	2700
ctgtagcacc	gcctacatac	ctcgcctctgc	taatcctggt	accagtggct	gctgccagtg	2760
gcgataagtc	gtgtcttacc	gggttggaact	caagacgata	gttaccggat	aaggcgcagc	2820
ggtcgggctg	aacgggggggt	tcgtgcacac	agcccagctt	ggagcgaacg	acctacaccg	2880
aactgagata	cctacagcgt	gagctatgag	aaagcgccac	gcttcccga	gggagaaagg	2940
cggacaggta	tccggtaagc	ggcagggctcg	gaacaggaga	gcgcacgagg	gagcttccag	3000
ggggaaacgc	ctggtatctt	tatagtcctg	tcgggtttcg	ccacctctga	cttgagcgtc	3060
gattttttgtg	atgctcgtca	ggggggcgga	gcctatggaa	aaacgccagc	aacgcggcct	3120
ttttacgggt	cctggccttt	tgtctgcact	ttgtcacat	gttctttcct	gcgttatccc	3180
ctgattctgt	ggataaccgt	attaccgcct	ttgagtgcg	tgataaccgt	cgccgcagcc	3240
gaacgaccga	gcgcagcgag	tcagtgcgag	aggaagc			3277

<210> 9
 <211> 7814
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Pgt7

<400> 9

gacagctgtc	tcttgatcag	atctcatgca	agcttcagct	cactcactca	agatgtgtat	60
aagagacagt	cgagatcccc	gccacggttg	atgagagctt	tggtgtaggt	ggaccagttg	120
gtgattttga	acttttgctt	tgccacggaa	cggctcgcgt	tgtcgggaag	atgcgtgatc	180
tgatccttca	actcagcaaa	agttcgattt	attcaacaaa	gccgcgctcc	cgtcaagtca	240
gcgtaatgct	ctgccagtgt	tacaaccaat	taaccaattc	tgattagaaa	aactcatcga	300
gcatcaaagt	aaactgcaat	ttattcatat	caggattatc	aataccatat	ttttgaaaaa	360
gccgtttctg	taatgaagga	gaaaactcac	cgaggcagtt	ccataggatg	gcaagatcct	420
ggtatcgggt	tgcgattccg	actcgcccaa	catcaataca	acctattaat	ttcccctcgt	480
caaaaataag	gttatcaagt	gagaaatcac	catgagtgc	gactgaatcc	ggtgagaatg	540
gcaaaagttt	atgcatttct	ttccagactt	gttcaacagg	ccagccatta	cgctcgtcat	600
caaaatcact	cgcatacaac	aaaccgttat	tcattcgtga	ttgcgcctga	gcgagacgaa	660
atacgcgata	gctgttaaaa	ggacaattac	aaacagggaat	cgaatgcaac	cggcgagga	720
acactgccag	cgcatacaac	atattttcac	ctgaatcagg	atattcttct	aatacctgga	780
atgctgtttt	tccggggatc	gcagtgggtg	gtaaccatgc	atcatcagga	gtacggataa	840
aatgcttgat	ggtcgggaag	ggcataaatt	ccgtcagcca	gtttagtctg	accatctcat	900
ctgtaacatc	attggcaacg	ctacctttgc	catgtttcag	aaacaactct	ggcgcatcgg	960
gcttcccata	caatcgatag	attgtcgcac	ctgattgccc	gacattatcg	cgagcccatt	1020
tatacccata	taaatcagca	tccatgttgg	aatttaatcg	cggcctcgag	caagacgttt	1080
cccgttgaat	atggtcata	acaccccttg	tattactggt	tatgtaagca	gacagtttta	1140
ttgttcatga	tgatatattt	ttatcttggt	caatgtaaca	tcagagattt	tgagacacaa	1200
cgtggctttc	ccccccccc	ctatgcggtg	tgaaataccg	cacagatgcg	taagggacaa	1260
atacgcgata	aggacgcgcc	ctgtagcggc	gcattaagcg	cggcgggtgt	ggtggttacg	1320
cgcagcgtga	cgtacactt	gccagcgccc	tagcgccgcg	tcctttcgtc	ttcttccctt	1380
cctttctcgc	cacgttcgcc	atgcataatg	tgctgtcaca	atggacgaag	cagggattct	1440
gcaaaccccta	tgctactccg	tcaagccgtc	aattgtctga	ttcgttacca	attatgacaa	1500
cttgacgggt	acatcattca	ctttttcttc	acaaccggca	cggaaactgc	tcgggctggc	1560
cccgttgcat	tttttaata	cccgcgagaa	atagagttga	tcgtcaaaac	caacattgcy	1620
accgacgggt	gcgataggca	tccgggtggt	gtcaaaaagc	agcttcgcct	ggctgatacg	1680
ttggtcctcg	cgccagctta	agacgcta	ccctaactgc	tggcggaaaa	gatgtgacag	1740
acgcgacggc	gacaagcaaa	catgctgtgc	gacgctggcg	atatcaaaat	tgctgtctgc	1800
caggtgatcg	ctgatgtact	gacaagcctc	gcgtaccgga	ttatccatcg	gtggatggag	1860
cgactcgtta	atcgcttcca	tgccgcgcag	taacaattgc	tcaagcagat	ttatcgccag	1920
cagctccgaa	tagcgccctt	ccccttgccc	ggcggttaatg	atttgcccaa	acaggctcgt	1980
gaaatgcggc	tggtgcgctt	catccggggc	aaagaacccc	gtattggcaa	atattgacgg	2040
ccagttaagc	cattcatgcc	agtaggcgcg	cggacgaaag	taaaccact	ggtgatacca	2100
ttcgcgagcc	tccggatgac	gaccgtagt	atgaatctct	cctggcgagg	acagcaaaat	2160
atcacccggt	cggcaaaaca	attctcgtcc	ctgatttttc	accacccctt	gaccgcgaat	2220
ggtgagattg	agaatataac	ctttcattcc	cagcggtcgg	tcgataaaaa	aatcgagata	2280
accgttggtc	tcaatcggcg	ttaaaccgcg	caccagatgg	gcattaaacg	agtatcccg	2340
cagcagggga	tcattttgcg	cttcagccat	acttttcata	ctcccgccat	tcagagaaga	2400
aaccaattgt	ccatattgca	tcagacattg	ccgtcactgc	gtcttttact	ggctcttctc	2460
gctaaccaaa	ccggtaaccc	cgcttattaa	aagcattctg	taacaaagcg	ggaccaaagc	2520
catgacaaaa	acgcgtaaca	aaagtgtcta	taatcacggc	agaaaagtcc	acattgatta	2580
tttgacgggc	gtcacacttt	gctatgccat	agcattttta	tccataagat	tagcggatcc	2640
tacctgacgc	tttttatcgc	aactctctac	tgtttctcca	taccggtttt	tttgggctag	2700
aaataatttt	gttttaactt	aagaaggaga	tataaccatg	ataacttctg	ctcttcactg	2760
tgccgcccag	tggtgctaat	ctgtgttctc	ttcggcgggc	ctgggtgatc	ctcgccgtac	2820
tgcccgcttg	gttaacgctg	ccgccaatt	ggcaaaatat	tctggtaaat	caataacccat	2880
ctcatcagag	ggtagtaaa	ccgcccagga	aggcgcttac	cgatttatcc	gcaatcccaa	2940
cgtttctgcc	gaggcgatca	gaaaggctgg	cgccatgcaa	acagtcaagt	tggtcagga	3000
gtttcccgaa	ctgctggcca	ttgaggacac	cacctctttg	agttatcgcc	accaggtcgc	3060
cgaagagctt	ggcaagctgg	gctctattca	ggataaatcc	cgcggatggg	gggttctact	3120
cgttctcttg	ctcgaggcca	ccacattccg	caccgtagga	ttactgcata	aggagtgggtg	3180
gatgcgcccc	gatgaccctg	ccgatgcgga	tgaaaaggag	agtggcaaat	ggctggcagc	3240
ggccgcaact	agccggttac	gcattgggag	catgatgagc	aacgtgattg	cgtctgtga	3300

ccgcgaagcc	gatattcatg	cttatctgca	ggacaaactg	gcgcataacg	agcgcttcgt	3360
ggtgcgctcc	aagcaccac	gcaaggacgt	agagtctggg	ttgtatctgt	acgaccatct	3420
gaagaaccaa	ccggagttgg	gtggctatca	gatcagcatt	ccgcaaaagg	gcgtgggtgga	3480
taaacgcggt	aaacgtaaaa	atcgaccagc	ccgcaaggcg	agcttgagcc	tgcgcagtg	3540
gcgcatacac	ctaaaacagg	ggaatatcac	gctcaacgcg	gtgctggccg	aggagattaa	3600
cccgcccaag	ggtgagaccc	cggtgaaatg	gttgttgctg	accagcgaac	cggtcgagtc	3660
gctagcccaa	gccttgccg	tcacgcacat	ttatacccat	cgctggcgga	tcgaggagtt	3720
ccataaggca	tggaaaaccg	gagcaggagc	cgagaggcaa	cgcatggagg	agccggataa	3780
tctggagcgg	atggtctcga	tcctctcggt	tggtgcggtc	aggctgttac	agctcagaga	3840
aagcttcacg	ccgccgcaag	cactcagggc	gcaagggtcg	ctaaaggaag	cggaacacgt	3900
agaaagccag	tccgcagaaa	cggtgctgac	cccggatgaa	tgtcagctac	tgggctatct	3960
ggacaagggg	aaacgcaagc	gcaaagagaa	agcaggtagc	ttgcagtg	cttacatggc	4020
gatagctaga	ctggg	ttatggacag	caagcgaacc	ggaattgcca	gctggggcgc	4080
cctctggtaa	ggttggaag	ccctgcaaa	taaactggat	ggctttcttg	ccgccaaagg	4140
tctgatggcg	caggggatca	agatctgatc	cggtcttcc	ccgtcaagct	ctaaatcggg	4200
ggctcgactg	tctcttatac	acatcttgag	tgagtgagaa	cctgcattaa	tgaatcgggt	4260
accgagctcg	aattacttca	ctgacaccct	catcagtgcc	aacatagtaa	gccagtatatac	4320
actccgctag	cgctgatgtc	cggcggtgct	tttgccgtta	cgccaccacc	cgctcagtagc	4380
tgaacaggag	ggacagctga	tagaaacaga	agccactgga	gcacctcaaa	aacaccatca	4440
tactactaat	cagtaagttg	gcagcatcac	ccgacgcact	ttgcgcgcaa	taaatacctg	4500
tgacggaaga	tcacttcgca	gaataaataa	atcctggtgt	ccctgttgat	accgggaagc	4560
cctgggcca	cttttg	aaatgagacg	ttgatcggca	cgtaagaggt	tccaactttc	4620
accataatga	aataagatca	ctaccggg	tattttttga	gttatcgaga	ttttcaggag	4680
ctaagggaagc	taaaatggag	aaaaaaatca	ctggatatac	caccgttgat	atatcccaat	4740
ggcatcgtaa	agaacatttt	gaggcatttc	agtcagttgc	tcaatgtacc	tataaccaga	4800
ccgttcagct	ggatattacg	gcctttttta	agaccgtaaa	gaaaaataag	cacaagtttt	4860
atccggcctt	tattcacatt	cttgcgcc	tgatgaatgc	tcacccgga	ttccgtatgg	4920
caatgaaaga	cggtgagctg	gtgatatggg	atagtgttca	cccttggtac	accgttttcc	4980
atgagcaaac	tgaacgttt	tcacgcctct	ggagtgaata	ccacgacgat	ttccggcag	5040
ttctacacat	atattcgcaa	gatgtggcgt	gttacggtga	aaacctggcc	tatttcccta	5100
aagggtttat	tgagaatatg	tttttcgtct	cagccaatcc	ctgggtgagt	ttcaccagtt	5160
ttgatttaaa	cgtggccaat	atggacaact	tcttcgcccc	cgttttcacc	atgggcaaat	5220
attatacgca	aggcgacaag	gtgctgatgc	cgctggcgat	tcaggttcat	catgccgtct	5280
gtgatggctt	ccatgtcggc	agaatgctta	atgaattaca	acagtactgc	gatgagtggc	5340
agggcggggc	gtaatttttt	taaggcagtt	attggtgccc	ttaaacgcct	gggtgctacgc	5400
ctgaataaatt	gataataagc	ggatgaatgg	cagaaattcg	aaagcaaatt	cgacccgggtc	5460
gtcggttcag	ggcagggctg	ttaaatagcc	gcttatgtct	attgctggtt	taccggttta	5520
ttgactaccg	gaagcagtg	gaccgtgtgc	ttctcaaattg	cctgaggcca	gtttgctcag	5580
gctctccccg	tggaggtaat	aattgacgat	atgatcattt	attctgcctc	ccagagcctg	5640
ataaaaacgg	ttagcgcttc	gttaatacag	atgtaggtgt	tccacagggt	agccagcagc	5700
atcctgcgat	gcagatccgg	aacataatgg	tgcaaggcgc	ttgtttcggc	gtgggtatgg	5760
tggcaggccc	cgtggccggg	ggactgttgg	gcgtgccc	cacctgtcct	acgagttgca	5820
tgataaagaa	gacagtcata	agtgcggcga	cgaaattcag	atctgatcaa	gagacagctg	5880
tcgacgtcag	gtggcacttt	tcggggaaat	gtgcgcgga	cccctatttg	tttatttttt	5940
taaatacatt	caaatatgta	tccgctcatg	agacaataac	cctgataaat	gcttcaataa	6000
tattgaaaaa	ggaagagtat	gagtattcaa	catttccgtg	tcgcccttat	ttcccttttt	6060
gcggcatttt	gccttctgt	ttttgctcac	ccagaaacgc	tggtgaaagt	aaaagatgct	6120
gaagatcagt	tgggtgcacg	agtgggttac	atcgaactgg	atctcaacag	cggtaaagatc	6180
cttgagagtt	ttcgccccga	agaacgtttt	ccaatgatga	gcacttttaa	agttctgcta	6240
tgtggcgcg	tattatcccg	tattgacgcc	gggcaagagc	aactcggtcg	ccgcatacac	6300
tattctcaga	atgacttgg	tgagtactca	ccagtcacag	aaaagcatct	tacggatggc	6360
atgacagtaa	gagaattatg	cagtgtctgc	ataaccatga	gtgataaacac	tgcggccaac	6420
ttactttcga	caacgatcga	aggaccgaag	gagctaaccg	cttttttgca	caacatgggg	6480
gatcatgtaa	ctgcgcttga	tcgttgggaa	ccggagctga	atgaagccat	accaaacgac	6540
gagcgtgaca	ccacgatgcc	tgtagcaatg	gcaacaacgt	tgcgcaaaact	attaactggc	6600
gaactactta	ctctagcttc	ccggcaacaa	ttaatagact	ggatggaggc	ggataaagtt	6660
gcaggaccac	ttctgcgctc	ggcccttccg	gctggctggt	ttattgctga	taaatctgga	6720
gccggtgagc	gtgggtctcg	cggtatcatt	gcagcactgg	ggccagatgg	taagccctcc	6780
cgtatcgtag	ttatctacac	gacggggagt	caggcaacta	tggatgaacg	aaatagacag	6840
atcgctgaga	taggtgcctc	actgattaag	cattggtaac	tgtcagacca	agtttactca	6900

tatatacttt	agattgattt	aaaacttcat	ttttaattta	aaaggatcta	ggtgaagatc	6960
ctttttgata	atctcatgac	caaaatccct	taacgtgagt	tttcggtcca	ctgagcgtca	7020
gaccccgtag	aaaagatcaa	aggatcttct	tgagatcctt	tttttctgcg	cgtaatctgc	7080
tgcttgcaaa	caaaaaaacc	accgctacca	gcggtgggtt	gtttgccgga	tcaagagcta	7140
ccaactcttt	ttccgaaggt	aactggcttc	agcagagcgc	agataccaaa	tactgtcctt	7200
ctagtgtagc	cgtagttagg	ccaccacttc	aagaactctg	tagcaccgcc	tacatacctc	7260
gctctgctaa	tcctgttacc	agtggctgct	gccagtggcg	ataagtcgtg	tcttaccggg	7320
ttggactcaa	gacgatagtt	accggataag	gcgcagcggg	cgggctgaac	gggggggttcg	7380
tgcacacagc	ccagcttgga	gcgaacgacc	tacaccgaac	tgagatacct	acagcgtgag	7440
ctatgagaaa	gcgccaagct	tcccgaaggg	agaaaggcgg	acaggtatcc	ggtaagcggc	7500
agggtcggaa	caggagagcg	cacgagggag	cttccagggg	gaaacgcctg	gtatctttat	7560
agtcctgtcg	ggtttcgcca	cctctgactt	gagcgtcgat	ttttgtgatg	ctcgtcaggg	7620
gggcggagcc	tatggaaaaa	cgccagcaac	gcggcctttt	tacggttcct	ggccttttgc	7680
tggccttttg	ctcacatggt	ctttcctgcg	ttatcccctg	attctgtgga	taaccgtatt	7740
accgcctttg	agtgaagctga	taccgctcgc	cgcagccgaa	cgaccgagcg	cagcgagtca	7800
gtgagcgagg	aagc					7814

<210> 10

<211> 9265

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Pgt8

<400> 10

ctaagaaacc	attattatca	tgacattaac	ctataaaaat	aggcgtatca	cgaggccctt	60
tcgtcttcaa	gggtcgctca	ctgcccgtt	tccagtcggg	aaacctgtcg	tgccagctgc	120
attaatgaat	cggccaacgc	gcggggagag	gcggtttgcg	tattgggcgc	cagggtggtt	180
tttcttttca	ccagtgaagc	gggcaacagc	tgattgccct	tcaccgcctg	gccctgagag	240
agttgcagca	agcgggtccac	gctgggttgc	cccagcaggc	gaaaatcctg	tttgatggtg	300
gttgacggcg	ggatataaca	tgagctgtct	tcgggtatcgt	cgtatcccac	taccgagata	360
tccgcaccaa	cgcgcagccc	ggactcggtg	atggcgcgca	ttgcgcccag	cgccatctga	420
tcgttgccaa	ccagcatcgc	agtgggaacg	atgccctcat	tcagcatttg	catggtttgt	480
tgaaaaccgg	acatggcact	ccagtcgcct	tcccgttccg	ctatcggtcg	aatttgattg	540
cgagtgaagc	atattatgcca	gccagccaga	cgcagacgcg	ccgagacaga	acttaatggg	600
cccgtcaaca	gcgcgatttg	ctggtgaccc	aatgcgacca	gatgctccac	gcccagtcgc	660
gtaccgtctt	catgggagaa	aataatactg	ttgatgggtg	tctggtcaga	gacatcaaga	720
aataacgccg	gaacattagt	gcaggcagct	tccacagcaa	tggcatcctg	gtcatccagc	780
ggatagttaa	tgatcagccc	actgacgcgt	tgcgcgagaa	gattgtgcac	cgccgcttta	840
caggcttcga	cgccgcttcg	ttctaccatc	gacaccacca	cgctggcacc	cagttgatcg	900
gcgcgagatt	taatcgccgc	gacaatttgc	gacggcgcgt	gcagggccag	actggagggtg	960
gcaacgccaa	tcagcaacga	ctggtttgcc	gccagttggt	gtgccacgcg	gttggaatg	1020
taattcagct	ccgccatcgc	cgcttccact	ttttcccgcg	ttttcgcaga	aacgtggctg	1080
gcctggttca	ccacgcggga	aacggtctga	taagagacac	cggcatactc	tgcgacatcg	1140
tataacgtta	ctggtttcac	attcaccacc	ctgaattgac	tctcttccgg	gcgctatcat	1200
gccataccgc	gaaagggttt	gcaccattcg	atggtgtcgg	cagcgttggg	tcttgccac	1260
gggtgcgcat	gatcgtgctc	ctgtcgttga	ggaccgggt	agagtcgcaa	cgcaattaat	1320
gtgagttagc	tactcatta	ggcaccaccg	gctttacact	ttatgcttcc	ggctcgtatg	1380
ttgtgtggaa	ttgtgagcgg	ataacaattt	cacacaggaa	acaggggtac	cctgcttgca	1440
aacaaaaaaa	ccaccgctac	cagcggtggt	tggtttgcgg	gatcaagagc	taccaactct	1500
ttttccgaag	gtaactggct	tcagcagagc	gtgatatcca	aatactgtcc	ttctagtgtg	1560
gcccgtagtt	ggccaccact	tcaagaactc	tgtagcaccg	cctacatacc	tcgctctgct	1620
aatcctgtta	ccagtggctg	ctgccagtgg	cgataagtcg	tgtcttaccg	ggttggactc	1680
aagacgatag	ttaccggata	aggcgcagcg	gtcgggctga	acgggggggt	cgtgcacaca	1740
gcccagcttg	gagcgaacga	cctacaccga	actgagatac	ctacagcgtg	agctatgaga	1800
aagcggccag	cttcccggaag	ggagaaaagg	ggacaggtat	ccggtaagcg	gcaggggtcg	1860
aacaggagag	cgcacgaggg	agcttccagg	gggaaacgcc	tggtatcttt	atagtcctgt	1920
cgggtttcgc	cacctctgac	ttgagcgtcg	atttttgtga	tgctcgtcag	gggggcggag	1980

cctatggaaa	aacgccagca	acgcggcctt	tttacggttc	ctggcctttt	getggccttt	2040
tgctcacatg	ttctttcctg	cgttatcccc	tgattctgtg	gataaccgta	ttaccgcctt	2100
tgagtgaagt	gataccgctc	gccgcagccg	aacgaccgag	cgcagcagag	cagtgaagca	2160
ggaagcggaa	gagcgcctga	tgcggtattt	tctccttacg	catctgtgcg	gtatttcaca	2220
ccgcatatgg	tgcactctca	gtacaatctg	ctctgatgcc	gcatagttaa	gccagtatac	2280
actccgctat	cgctacgtga	ctgggtcatg	gctgcgcccc	gacacccgcc	aacacccgct	2340
gacgcgcctt	gacgggcttg	tctgctcccg	gcatccgctt	acagacaagc	tgtgaccgtc	2400
tccgggagct	gcatgtgtca	gaggttttca	ccgtcatcac	cgaaacgcgc	gaggcgctg	2460
cggtaaagct	catcagcgtg	gtcgtgaagc	gattcacaga	tgtctgcctg	ttcatccgcg	2520
tccagctcgt	tgagttttct	cagaagcgtt	aatgtctggc	ttctgataaa	gcggggccatg	2580
ttaagggcgg	ttttttcctg	tttggtcact	gatgcctccg	tgtaaggggg	aattctgttc	2640
atgggggtaa	tgataccgat	gaaacgagag	aggatgtcca	cgatacgggt	tactgatgat	2700
gaacatgccc	ggttactgga	acgttgtgag	ggtaaacaac	tggcggtatg	gatgcggcgg	2760
gaccagagaa	aaatcactca	gggtcaatgc	cagcgcttcg	ttaatacaga	tgtaggtgtt	2820
ccacagggtg	gccagcagca	tcctgcgatg	cagatccgga	acataatggg	gcagggcgct	2880
gacttccgcg	tttccagact	ttacgaaaca	cggaaaccga	agaccattca	tgttggtgct	2940
caggtcgcag	acgtttttga	gcagcagtcg	cctcacgttc	gctcgcgtat	cggtgattca	3000
ttctgctaac	cagtaaggca	accccgccag	cttagatcct	tttagcttta	tgcttgtaaa	3060
ccgtttttgtg	aaaaaatatt	taaaataaaa	aaggggacct	ctagggtccc	caattaatta	3120
gtaatatata	ctattaaagg	tcattcaaaa	ggtcatccac	cggatccgag	ctcgaattgt	3180
aagaggttcc	aactttcacc	ataatgaaat	aagatcacta	ccgggcgtat	tttttgagtt	3240
atcgagattt	tcaggagcta	aggaagctaa	aatggagaaa	aaaatcactg	gatataccac	3300
cgttgatata	tcccaatggc	atcgtaaaga	acattttgag	gcatttcagt	cagttgtctca	3360
atgtacctat	aaccagaccg	ttcagctgga	tattacggcc	tttttaaaga	ccgtaaagaa	3420
aaataagcac	aagtttttat	cggcctttat	tcacattctt	gcccgcctga	tgaatgctca	3480
tccggaattc	cgtatggcaa	tgaaagacgg	tgagctgggt	atatgggata	gtgttcaccc	3540
ttgttacacc	gttttccatg	agcaaaactga	aacgttttca	tcgctctgga	gtgaatacca	3600
cgacgatttc	gggcagtttc	tacacatata	ttcgcaagat	gtggcggtgt	acggtgaaaa	3660
cctggcctat	ttccctaaag	ggttttattga	gaatatgttt	ttcgtctcag	ccaatccctg	3720
ggtgagtttc	accagttttg	atttaaacgt	ggccaatatg	gacaacttct	tcgcccccg	3780
tttcaccatg	ggcaaatatt	atacgcaagg	cgacaagggt	ctgatgccgc	tggcgattca	3840
ggttcacat	gccgtctgtg	atggcttcca	tgtcggcaga	atgcttaatg	aattacaaca	3900
gtactgcgat	gagtggcagg	gcggggcgta	atttttttaa	ggcagttatt	ggtgccctta	3960
aacgcctggt	gctacgcctg	aataattgat	aataagcgga	tgaatggcag	aaattcgaaa	4020
gcaaattcga	cccggctcgt	ggttcagggc	agggtcgtaa	aatagccgct	tatgtctatt	4080
gctggtttac	cggttttatt	actaccggaa	gcagtgtgac	cgtgtgcttc	tcaaatgcct	4140
gaggccagtt	tgctcaggct	ctccccgtgg	aggtaataat	tgacgatatg	atcattttatt	4200
ctgcctccca	gagcctgata	aaaacggtta	gcgcttcggt	aatacagatg	taggtgttcc	4260
acagggtagc	cagcagcatc	ctgcgatgca	gatccggaac	ataatgggtc	agggcgcttg	4320
tttcggcggtg	gggtatgggtg	caggccccgt	ggccggggga	ctggtgggcg	ctgccggcac	4380
ctgtcctacg	agttgcatga	taaagaagac	agtcataagt	gcggcgacga	aattcagatc	4440
tgatcaagag	acagctgtcg	acgtcagggtg	gcacttttcg	gggaaatgtg	cgcggaaccc	4500
ctattttgtt	attttttctaa	atacattcaa	atatgtatcc	gctcatgaga	caataaccct	4560
gataaatgct	tcaataatat	tgaaaaagga	agagtatgag	tattcaacat	ttccgtgtcg	4620
cccttattcc	cttttttgcg	gcatttttgc	ttcctgtttt	tgctcaccca	gaaacgctgg	4680
tgaaagtaaa	agatgctgaa	gatcagtttg	gtgcacgagg	gagcttccag	ggggaaacgc	4740
ctggatatct	tatagtccctg	tcgggttttcg	ccacctctga	cttgagcgtc	gattttttgtg	4800
atgctcgtca	ggggggcgga	gcctatggaa	aaacgccagc	aacgcggcct	ttttacgggt	4860
cctggccttt	tgetggcctt	ttgctcacat	gttctttcct	gcgttatccc	ctgattctgt	4920
ggataaccgt	attaccgcct	ttgagtgaag	tgataccgct	cgccgcagcc	gaacgaccga	4980
gcgcagcag	tcagtgaagc	aggaagcgac	agctgtctct	tgatcagatc	tcatgcaagc	5040
ttcagctcac	tcactcaaga	tgtgtataag	agacagtcga	gatccccgcc	acggttgatg	5100
agagctttgt	tgtaggtgga	ccagttgggtg	attttgaact	tttgctttgc	cacggaacgg	5160
tctgcgttgt	cggaagagatg	cgtgatctga	tccttcaact	cagcaaaaagt	tcgattttatt	5220
caacaaagcc	gccgtcccgt	caagtcaagc	taatgctctg	ccagtgttac	aaccaattaa	5280
ccaattctga	ttagaaaaac	tcactcgagca	tcaaatgaaa	ctgcaattta	ttcatatcag	5340
gattatcaat	accatatttt	tgaaaaagcc	gtttctgtaa	tgaaggagaa	aactcaccga	5400
ggcagttcca	taggatggca	agatcctggt	atcgggtctgc	gattccgact	cgtccaacat	5460
caatacaacc	tattaatttc	ccctcgtcaa	aaataaggtt	atcaagtgaag	aaatcaccat	5520
gagtgaagac	tgaatccggt	gagaatggca	aaagtttatg	cattttctttc	cagacttggt	5580

caacaggcca	gccattacgc	tcgtcatcaa	aatcactcgc	atcaacccaa	ccgttattca	5640
ttcgtgattg	cgctgagcg	agacgaaata	cgcatcgct	gttaaaagga	caattacaaa	5700
caggaatcga	atgcaaccgg	cgcaggaaca	ctgccagcgc	atcaacaata	ttttcacctg	5760
aatcaggata	ttcttctaata	acctggaatg	ctgtttttcc	ggggatcgca	gtgggtgagta	5820
accatgcac	atcaggagta	cggataaaat	gcttgatggt	cggaagaggc	ataaattccg	5880
tcagccagtt	tagtctgacc	atctcatctg	taacatcatt	ggcaacgcta	cctttgccat	5940
gtttcagaaa	caactctggc	gcacgggct	tccatacaa	tcgatagatt	gtcgacactg	6000
attgcccagc	attatcgca	gccattttat	acccatataa	atcagcatcc	atgttggaat	6060
ttaatcgcg	cctcgagcaa	gacgtttccc	gttgaatatg	gctcataaca	ccccttgat	6120
tactgtttat	gtaagcagac	agttttattg	ttcatgatga	tatatTTTTA	tcttgTgcaa	6180
tgtaacatca	gagattttga	gacacaacgt	ggctttcccc	cccccccta	tgcggtgtga	6240
aataccgcac	agatgcgtaa	ggagaaaata	ccgcatcagg	acgcgcctg	tagcggcgca	6300
ttaagcgcg	cgggtgtggt	ggttacgcgc	agcgtgacgc	tacacttgcc	agcgccctag	6360
cgcccgcctc	tttcgctttc	ttcccttcc	ttctcgccac	gttcgccatg	cataatgtgc	6420
ctgtcaaatg	gacgaagcag	ggattctgca	aaccctatgc	tactccgtca	agccgtcaat	6480
tgtctgattc	gttaccgaat	atgacaactt	gacggctaca	tcattcactt	tttcttcaca	6540
accggcacgg	aactcgctcg	ggctggcccc	ggtgcatttt	ttaaataccc	gcgagaaata	6600
gagttgatcg	tcaaaaccaa	cattgcgacc	gacggtggcg	ataggcatcc	gggtgggtgct	6660
caaaagcagc	ttcgctggc	tgatacgttg	gtcctcgcg	cagcttaaga	cgctaataccc	6720
taactgctgg	cggaaaagat	gtgacagacg	cgacggcgac	aagcaaacat	gctgtgcgac	6780
gctggcgata	tcaaaattgc	tgtctgccag	gtgatcgctg	atgtactgac	aagcctcgcg	6840
taccggatta	tccatcggtg	gatggagcga	ctcgTTaatc	gcttccatgc	gccgcagtaa	6900
caattgctca	agcagattta	tcgccagcag	ctccgaatag	cgcccttccc	cttgcccggc	6960
gttaatgatt	tgcccaaaaa	ggtcgctgaa	atgcggctgg	tgcgcttcat	ccgggcgaaa	7020
gaaccccgta	ttggcaaaata	ttgacggcca	gttaagccat	tcatgccagt	aggcgcgcg	7080
acgaaagtaa	accactggg	gataccattc	gcgagcctcc	ggatgacgac	cgtagatgag	7140
aatctctcct	ggcggaataa	gcaaaatatc	accggtcg	caaacaaatt	ctcgctccctg	7200
atttttcacc	acccctgac	cgcgaaatggt	gagattgaga	atataacctt	tcattcccag	7260
cggtcggtcg	ataaaaaaat	cgagataacc	gttggcctca	atcggcgtta	aaccgcgcac	7320
cagatgggca	ttaaacgagt	atcccggcag	caggggatca	ttttgcgctt	cagccatact	7380
tttcatactc	ccgccattca	gagaagaaac	caattgtcca	tattgcatca	gacattgccg	7440
tcactgcgtc	ttttactggc	tcttctcgct	aaccaaaccg	gtaaccccg	ttattaaaag	7500
cattctgtaa	caaagcgggg	ccaaagccat	gacaaaaacg	cgtaacaaaa	gtgtctataa	7560
tcacggcaga	aaagtcacaa	ttgattattt	gcacggcgct	acactttgct	atgccatagc	7620
atttttatcc	ataagattag	cggatcctac	ctgacgcttt	ttatcgcaac	tctctactgt	7680
ttctccatac	ccgttttttt	gggctagaaa	taattttggt	taactttaag	aaggagatat	7740
aaccatgata	acttctgctc	ttcatcgctg	ggccgactgg	gctaaatctg	tgttctcttc	7800
ggcggcgctg	ggtgatcctc	gccgtactgc	ccgcttggtt	aacgtcgccg	cccaattggc	7860
aaaatattct	ggtaaatcaa	taaccatctc	atcagagggt	agtaaagccg	cccaggaagg	7920
cgcttaccga	tttatccgca	atcccaacgt	ttctgccgag	gcgatcagaa	aggctggcg	7980
catgcaaaaca	gtcaagttgg	ctcaggaggt	tcccgaactg	ctggccattg	aggacaccac	8040
ctctttgagt	tatcgccacc	aggtcgccga	agagcttggt	aagctgggct	ctattcagga	8100
taaatcccgc	ggatggtggg	ttcactccgt	tctcttgctc	gaggccacca	cattccgcac	8160
cgtaggatta	ctgcacag	agtgggtggt	gcgcccggat	gacctgccc	atgcggatga	8220
aaaggagagt	ggcaaatggc	tggcagcgcc	cgcaactagc	cggttacgca	tgggcagcat	8280
gatgagcaac	gtgattggcg	tctgtgaccg	cgaagccgat	attcatgctt	atctgcagga	8340
caaactggcg	cataacgagc	gcttcgtggt	gcgctccaag	cacccacgca	aggacgtaga	8400
gtctgggttg	tatctgtacg	accatctgaa	gaaccaaccg	gagttgggtg	gctatcagat	8460
cagcattccg	caaaagggcg	tggtggataa	acgcggtaaa	cgtaaaaaatc	gaccagccc	8520
caaggcgagc	ttgagcctgc	gcagtggg	catcacgcta	aaacagggga	atatcacgct	8580
caacgcgggtg	ctggccgagg	agattaaccc	gcccgaagggt	gagaccccgt	tgaaatgggt	8640
gttgctgacc	agcgaaccgg	tcgagtcgct	agcccagcc	ttgcgcgtca	tcgacattta	8700
taccatctgc	tggcggtacg	aggagttcca	taaggcatgg	aaaaccggag	caggagccga	8760
gaggcaacgc	atggaggagc	cggataaatct	ggagcggatg	gtctcgatcc	tctcgtttgt	8820
tgcggtcagg	ctgttacagc	tcagagaaaag	cttcacgccc	ccgcaagcac	tcagggcgca	8880
agggctgcta	aaggaagcgg	aacacgtaga	aagccagtc	gcagaaacgg	tgctgacccc	8940
ggatgaatgt	cagctactgg	gctatctgga	caagggaaaa	cgcaagcgca	aagagaaagc	9000
aggtagcttg	cagtggtgctt	acatggcgat	agctagactg	ggcggtttta	tggaacagcaa	9060
gcgaaccgga	attgccagct	ggggcgccct	ctggttaagg	tggaagccc	tgcaaagtaa	9120
actggatggc	tttcttgccg	ccaaggatct	gatggcgag	gggatcaaga	tctgatccg	9180

gctttccccc tcaagctcta aatcgggggc tgcactgtct cttatacaca tcttgagtga 9240
gtgagaacct gcattaatga atcgg 9265

QBMAD\319926.1

gctttccccc tcaagctcta aatcgggggc tgcactgtct cttatacaca tcttgagtga 9240
gtgagaacct gcattaatga atcgg 9265

DOUBLE TRANSPOSITION METHODS FOR MANIPULATING NUCLEIC ACIDS
 Inventors: Igor Yu Goryshin/Todd A. Naumann/William S. Reznikoff
 Application No.:
 Docket Number: 960296.;97541

TABLE 1

Insert #	Δ #	Insert End	Δ End	Size	Partial ORFs	Complete ORFs	Grow w/o IPTG
1	1.3	1073109	1094823	21714	b1028;b1012	b1013;putA;putP;b1016-1018;ycdB;phoH;b1021-1025;ira5_3;b1027	Y
2	2.8	2776930	2770104	6826	b2638;b2647	b2639-b2646	Y
3	3.1	4407731	4403605	4126	yjl	yjleB;vacB;yjfh	Y
4	4.2	3735047	3725227	9821	yiaB	xyjB;xyjA;xyjF;xyjG;xyjH;xyjR;b3570	Y
4	4.6	3735047	3723521	11526	none	yiaH;yiaA;yiaB;xyjB;xyjA;xyjF;xyjG;xyjH;xyjR;b3570	Y
4	4.9	3735047	3719490	15557	yj5b	glyS;glyQ;yiaH;yiaA;yiaB;xyjB;xyjA;xyjF;xyjG;xyjH;xyjR;b3570	N
5	5.1	1224154	1210042	14112	mcrA;minD	b1160-b1173;minE	Y
6	6.2	3045069	3042244	2825	bglA;gcvP	ygf	Y
7	7.1	2779269	2767042	1227	b2633;b2647	b2634-b2646	Y
8	8.4	3882592	3882500	92	none	none	Y
9	9.7	4589240	4595093	5853	mdoB;tsr	yjIN;yjIM;b4356	Y
10	10.3	4141018	4117696	23322	menA;frwC	hslU;hslV;ftsN;cyfR;priA;rpmE;yjiX;metJ;metB;metL;metF;katG;yjiE;yjiF;gldA;talC;ptsA;yjiI	N
11	11.3	2793099	2795902	2803	gabP;b2668	ygaE;b2665-b2667	Y
12	12.17	14166	12088	2078	none	dnaK	N
13	13.19	4542104	4546611	4507	fmC;fimH	fmD;fmF;fimG	Y
14	14.17	3821524	3818998	2526	spoT	rpoZ;gmk	N
15	15.17	1570686	1544492	26194	yddC;yddG	fdnG;fdnH;fdnI;b1477;b1478;sfcaA;tpsV;b1481;osmC;b1483-1491;xasA;gadB	Y